**REMARKS**

In sections 2 and 3 of the Office Action, the Examiner rejected claims 30-44 under 35 U.S.C. §112, second paragraph, as being indefinite.

In objecting to independent claim 30, the Examiner asserts that the treatment planning process of independent claim 30 is unclear. Specifically, the Examiner wonders how the planning process occurs.

Orthodontists, as ones skilled in the art to which the present application pertains, routinely plan orthodontic treatments. In fact, planning an orthodontic treatment is the principal occupation of orthodontists. They plan the final positions of a patient's teeth, they plan the magnitudes and directions with which the patient's teeth must move to achieve the final positions, and they plan the appliances and forces that, when applied to the patient's teeth, will achieve the planned magnitudes and directions of teeth movement. Orthodontists also know that the treatment plan depends on a patient's crowding and spacing data. Accordingly, orthodontists will have no trouble in incorporating the crowding and spacing data recited in independent claim 30 into the planning process. In view of the above, it can

be seen that independent claim 30 is clear and definite to one skilled in the art.

In objecting to dependent claims 34 and 40, the Examiner raises two issues with respect the discrepancies as recited in these claims. The Examiner asserts that it is not clear what these discrepancies are, and the Examiner asserts that the purpose of these discrepancies is not clear.

As to the first issue, these claims themselves make it clear what these discrepancies are. For example, claim 34 recites that the first discrepancy is the sum of the crowding/spacing data of the first table, and that the second discrepancy is the sum of the crowding/spacing data of the second table. As is disclosed in the application, if the sum is negative, the teeth are crowded and more space is needed, whereas if the sum is positive, the teeth are not crowded and more space is not needed.

Accordingly, with respect to the nature of the discrepancies, these claims are clear and definite.

As to the second issue (i.e., the purpose of these discrepancies), as long as the invention being claimed has utility, the claims are not required to

recite a purpose. However, as one skilled in the art will understand, the discrepancies will provide an indication of whether additional space is needed and, therefore, assist in the planning of an effective orthodontic treatment.

Accordingly, with respect to the purpose of the discrepancies, these claims are clear and definite.

For the reasons given above, claims 30-44 satisfy the requirements of 35 U.S.C. §112, second paragraph.

In sections 4 and 5 of the Office Action, the Examiner rejected claims 1-44 under 35 U.S.C. §101 as being directed to non-statutory subject matter.

The Examiner asserts that, merely because these claims are directed to entering and summing data, the rejected claims do not produce a tangible and useful result.

However, as acknowledged by the Federal Circuit in State Street Bank & Trust Co. v. Signature Financial Group Inc., 149 F. 3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998), "the mere fact that a claimed invention involves inputting numbers, calculating numbers, outputting numbers and storing numbers, in and of itself, would not

render it nonstatutory." Instead, as also indicated by Section 2106 of the MPEP, the invention is patentable if it produces a useful, concrete, and tangible result.

The invention covered by the present claims does produce a useful, concrete, and tangible result. These claims are directed to an orthodontic method that is useful in correcting the positions of a patient's teeth.

Taking claim 1 as an example, first crowding/spacing data is entered in first and second tables. The first table relates to the cuspid to midline regions of a patient's jaw, the second table relates to the second molar to midline regions of the patient's jaw, and the first crowding/spacing data relates to the right and left cuspid to midline regions of the patient's jaw. Also, second and third crowding/spacing data are entered in the second table but not the first table. The second crowding/spacing data relates to bicuspid regions of the patient's jaw, and the third crowding/spacing data relates to the molar regions of the patient's jaw. Further, curve of Spee spacing data, midline spacing data, and incisor position data are entered in the first and second tables. The curve of Spee spacing data

relates to space required to correct a curve of Spee of the patient's jaw, the midline spacing data relates to space created and required to move a midline of teeth in the patient's jaw, and the incisor position data relates to space required to correct positions of incisors in the patient's jaw. A first total is created for the first table but not the second table by summing the first crowding/spacing data, the curve of Spee spacing data, the midline spacing data, and the incisor position data. A second total is created for the second table but not the first table by summing the first crowding/spacing data, the second crowding/spacing data, the third crowding/spacing data, the curve of Spee spacing data, the midline spacing data, and the incisor position data.

Accordingly, claim 1 involves the real world object of transforming data regarding teeth position into a very useful, concrete and tangible organizational output arrangement that is useful in providing orthodontic treatments. Therefore, the claimed invention is directed to statutory subject matter.

As indicated by Section 2106 of the MPEP, the practical application (real world object) for the claimed invention should preferably, although not necessarily, be

disclosed in the application itself. The present application discloses a practical application for the claimed invention. For example, the present application discloses that the claimed invention is useful in providing orthodontic treatment.

It cannot be doubted that an orthodontic treatment is highly practical to the orthodontist as well as to the patient.

Accordingly, because the present invention is highly practical, it produces a "useful, concrete and tangible result." Therefore, again, the claimed invention is directed to statutory subject matter.

Section 2106 of the MPEP gives several examples illustrating claimed inventions that have a practical application because they produce useful, concrete, and tangible results. One example involves transforming input data representing discrete dollar amounts into output data representing a final share price. This data transformation was found to constitute a practical application producing a useful, concrete and tangible result. Similarly, the present claims involve transforming input data into useful orthodontic output data.

Therefore, according to this example, the claimed invention is directed to statutory subject matter.

Section 2106 of the MPEP also states that the plain and unambiguous meaning of section 101 is that any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if it meets the requirements for patentability, and further states that the subject matter, which courts have found to be outside the statutory categories of invention, is limited to abstract ideas, laws of nature, and natural phenomena.

The Examiner does not assert that the claimed invention is a law of nature or a natural phenomena. However, the Examiner appears to suggest that the invention presently being claimed is abstract because it is directed to merely inputting data, making calculations, and outputting data. But, as indicated above, the input data to the claimed method is manipulated in a very concrete way to produce a very tangible result.

Finally, the Examiner's attention is directed to Ex Parte Donner, 53 USPQ2d 1699, (Bd Pat App & Inter,

1999), in which the Board considered a claim to a method of storing and analyzing input data so as to produce an output in the form of an estimated value. The Board held that this transformation of data produced a useful, concrete and tangible result.

Similarly, transforming data regarding teeth positions into orthodontic output data useful in providing orthodontic treatment produces a useful, concrete and tangible result.

For all of the reasons given above, the claimed invention is directed to statutory subject matter.

In sections 6 and 7 of the Office Action, the Examiner rejected claims 1-44 under 35 U.S.C. §102(b) as being anticipated by Andreiko.

Andreiko discloses a system and method for automatically designing custom orthodontic appliances. Final positions of a patient's teeth are derived from digitized information of the anatomical shape of the patient's mouth, and an orthodontic appliance is automatically designed from the digitized shape information and the derived tooth final positions. The appliance is automatically fabricated from the design.

According to Andreiko, the digitized information is generated from measurements of the mouth of the patient, either taken directly or from a model of the patient's mouth, and includes information of the shapes of the individual teeth of the patient and of the patient's lower jaw. The final tooth positions include the derivation of an archform conforming to a skeletal archform defined by the shape of the lower jaw. The appliance is configured in accordance with the shape of this archform. Additional archforms may be constructed using information about the shapes of the individual teeth and the lower jaw skeletal archform to define the positions of the buccal cusps and incisal tips of the mandibular teeth, the marginal ridges of the upper posterior teeth, and the lingual points of occlusion of the upper anterior teeth to position the teeth according to a preferred treatment plan.

An archwire forming machine is provided to automatically form an arcuate appliance that interconnects the teeth to move them toward their final positions. The archwire forming machine reads input data of the anatomical shape of the patient's jaw and teeth, derives the tooth final positions and the archwire and

bracket designs that will move the teeth to the calculated final positions, and generates code to produce the archwire in accordance with the design. A bracket fabrication machine fabricates the brackets based on the final tooth position calculations and the digitized tooth shape data, and determines positions on the teeth to receive archwires that are inclined at computer determined angles.

Independent claim 1 - As can be seen, Andreiko does not disclose a method involving entering cuspid to midline crowding/spacing data, curve of Spee spacing data, midline spacing data, and incisor position data in first and second tables, and entering bicuspid and molar crowding/spacing data in the second table but not the first table, where the first table relates to the cuspid to midline regions of a patient's jaw, and where the second table relates to the second molar to midline regions of the patient's jaw.

The Examiner, in pointing to certain passages of Andreiko, asserts that Andreiko discloses entering the data into a first table that relates to cuspid to midline regions of a patient's jaw and into a second table that relates to second molar to midline regions of the

patient's jaw. These passages will be discussed below in the order that they are cited by the Examiner, and it will be shown that none of these passages discloses or suggests entering data in the tables recited in independent claim 1.

Column 12, lines 18-32 state that the various teeth of the patient are identified as $T_{JSI}$, or T(J,S,I), where J designates the jaw (upper or lower), where S designates the side of the jaw,, and where I designates the tooth by position relative to the jaw centerline.

As can be seen, there is no mention here of the tables recited in independent claim 1.

Column 13, lines 53-68 state that the entry of information into an input computer involves digitizing information to produce digitized anatomical information in machine readable form for analysis by an analyzing computer, that the input computer is connected to a scanner that produces anatomical geometric information describing the patient's teeth and jaw, and that the images [from the scanner] are three-dimensional, or are along a plurality of planes or other surfaces that can ultimately be combined to provide information in three dimensions.

As can be seen, there is no mention here of entering data in the tables recited in independent claim 1.

Column 37, lines 5-18 state that, in order to input data of a patient's mandibular teeth and lower jaw, an image of a mandibular model is first input to a screen of the computer, that a grid G is overlaid on the image as illustrated in Figure 4, that the grid G has grid lines that intersect the image on the screen, and that the operator resizes the grid G, if necessary, and orients the image relative to the grid G in order to define X,Y coordinates with a Y axis on a midline of the patient's lower jaw and an X axis perpendicular to the Y axis through a selected intersection point or origin 0,0, preferably set at the mesial contact points of the patient's lower central incisors.

As can be seen, neither the image nor the grid form the tables that are recited in independent claim 1. Hence, there is no mention in this portion of Andreiko of entering data into the tables recited in independent claim 1.

Column 17, lines 40-59 state that Figures 3A and 3B illustrate images of two sections of a mandibular

digitized model, that such images are rotated to a horizontal plan view, that a derivation of the same information that is available from an imager may be derived, that points may be selected automatically or by an operator from the images for digitization, and that the images may be rotated into other orientations for the derivation of other information.

As can be seen, there is no mention in this portion of Andreiko of entering data into the tables recited in independent claim 1.

Column 15, line 53 to column 16, line 4 state that input information includes a full three dimensional image that is simplified by reducing it to curves in differently oriented planes or flat curved surfaces each of which is defined in the independent X-Y coordinate system, that these planes are oriented, translated and rescaled to derive ideal finish positions of a patient's teeth and a design of a custom appliance, and that curves and points on the contours of the patient's jaw and teeth are expressed in terms of orthodontic parameters so that orthodontic knowledge and experience and computer analysis can be combined to minimize the use of the

orthodontist's time, to shorten the patient's treatment period, and to optimize the final treatment result.

As can be seen, there is no mention in this portion of Andreiko of entering data into the tables recited in independent claim 1.

Column 37, lines 19-35 state that a computer prompts an operator to select tooth contact points and jaw bone boundaries to digitize the X,Y coordinates of the mesial and distal extremities for each mandibular tooth, that the mesial extremity is the point on a tooth closest to the midline along the mandibular arch, that the distal extremity is the point on a tooth closest to the rear of the mouth along the mandibular arch, and that the mesio-distal width of each tooth I is calculated from the X,Y coordinates using the Pythagorean theorem.

As can be seen, there is no mention in this portion of Andreiko of entering data into the tables recited in independent claim 1.

Column 37, lines 36-51 (column 37, lines 19-35 have been discussed above) state that the mesio-distal widths as calculated using the Pythagorean theorem are summed to calculate the total length required of the arch to accommodate the mandibular teeth, and that, since all

teeth will be finally positioned to be in contact with adjacent teeth, this length remains a constant length of any arch on which the mandibular teeth are placed in the calculations.

As can be seen, there is no mention in this portion of Andreiko of entering data into the tables recited in independent claim 1.

Column 39, lines 53-55 state that the input procedure continues, and that coordinates are input for right and left mandibular cuspid cusp tips as illustrated in Figure 4.

As can be seen, there is no mention in this portion of Andreiko of entering data into the tables recited in independent claim 1.

Column 40, lines 2-18 state that coordinates or right and left mesiobuccal cusp tips of the mandibular first molars are calculated, and that the distance between these points is calculated, and that this information is used to determine if and how much the mandibular intermolar distance is to be altered.

As can be seen, there is no mention in this portion of Andreiko of entering data into the tables recited in independent claim 1.

Column 40, line 65 to column 31, line 15 state that coordinates of the central fossae of the maxillary first molars are input, that the distance between the central fossae is calculated, that this information is recalculated after the tooth finish positions are calculated to coincide with the spacing of the mandibular first molars, and that this information is compared with this initial measurement as an indicator of whether the intermolar width will be changed by treatment and of the amount of such change, if any.

As can be seen, there is no mention in this portion of Andreiko of entering data into the tables recited in independent claim 1.

Accordingly, none of the passages from Andreiko cited by the Examiner discloses or suggests entering data into the tables specified by independent claim 1. Andreiko does describe storing data in files. However, a file is not equivalent to a table. Accordingly, Andreiko does not disclose the use of tables. Moreover, there is certainly no disclosure in Andreiko of the specific tables recited in independent claim 1, i.e., a first table containing data relating to cuspid to midline regions of a patient's jaw, and a second table containing

data relating to second molar to midline regions of the patient's jaw. Indeed, there is not even a hint of these tables in Andreiko.

Because Andreiko does not disclose or suggest entering data in the first and second tables recited in independent claim 1, independent claim 1 is patentable over Andreiko.

Independent claim 14 similarly recites entering cuspid to midline region crowding/spacing data, curve of Spee spacing data, midline spacing data, incisor position data, and other created space in first and second tables, and entering cuspid to midline region and molar region crowding/spacing data in the second table, where the first table contains data related only to cuspid to midline regions of a patient's jaw, and where the second table relates to second molar to midline regions of the patient's jaw.

As should be understood from the discussion related to independent claim 1, Andreiko does not disclose or suggest entering data in the first and second tables recited in independent claim 14. Accordingly, independent claim 14 is patentable over Andreiko.

Independent claim 22 recites entering midline and molar relationships into a midline chart, entering crowding/spacing data into a discrepancy chart having first and second tables, and entering data from the first and second tables into an anticipated treatment chart. The first table contains data related only to cuspid to midline regions of a patient's jaw, and the second table relates to second molar to midline regions of the patient's jaw and includes the cuspid to midline regions of the patient's jaw.

As should be understood from the above discussion, Andreiko does not disclose or suggest entering data in the first and second tables recited in independent claim 22. Accordingly, independent claim 22 is patentable over Andreiko.

Independent claim 30 recites entering cuspid to midline region crowding/spacing data in a first table, entering second molar to midline region crowding/spacing data in a second table, and planning an orthodontic treatment based upon the crowding/spacing data entered into the first and second tables.

As should be clear from the discussion of Andreiko, Andreiko does not disclose or suggest entering

data in the first and second tables recited in independent claim 30. Accordingly, independent claim 30 is patentable over Andreiko.

Because independent claims 1, 14, 22, and 30 are patentable over Andreiko, dependent claims 2-13, 15-21, 23-29, and 31-44 are likewise patentable over Andreiko.

**CONCLUSION**

In view of the above, the claims of the present application are definite, are directed to statutory subject matter, and patentably distinguish over the art applied by the Examiner. Accordingly, allowance of these claims and issuance of the present application are respectfully requested.

Respectfully submitted,

SCHIFF HARDIN LLP
6600 Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606
(312) 258-5000
CUSTOMER NO. 32692

By: _____
Trevor B. Joike
Registration No.: 25,542
Attorney for Applicants

September 20, 2006